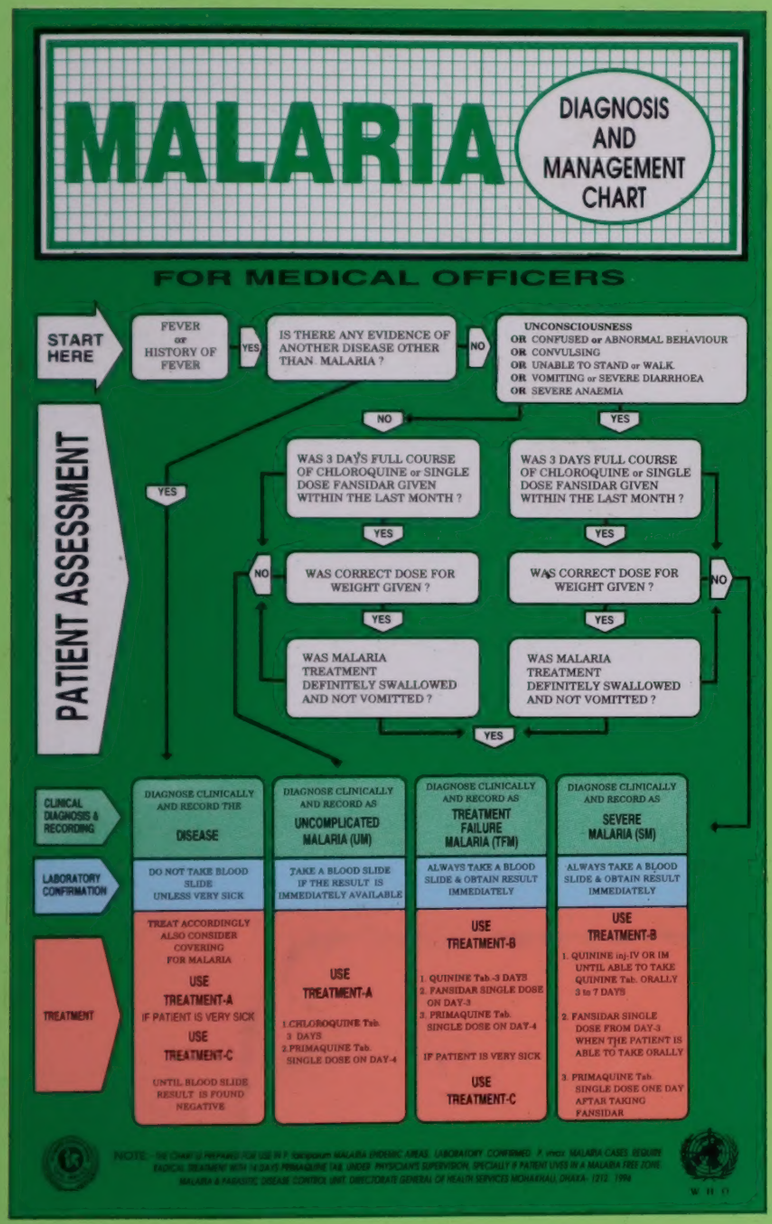
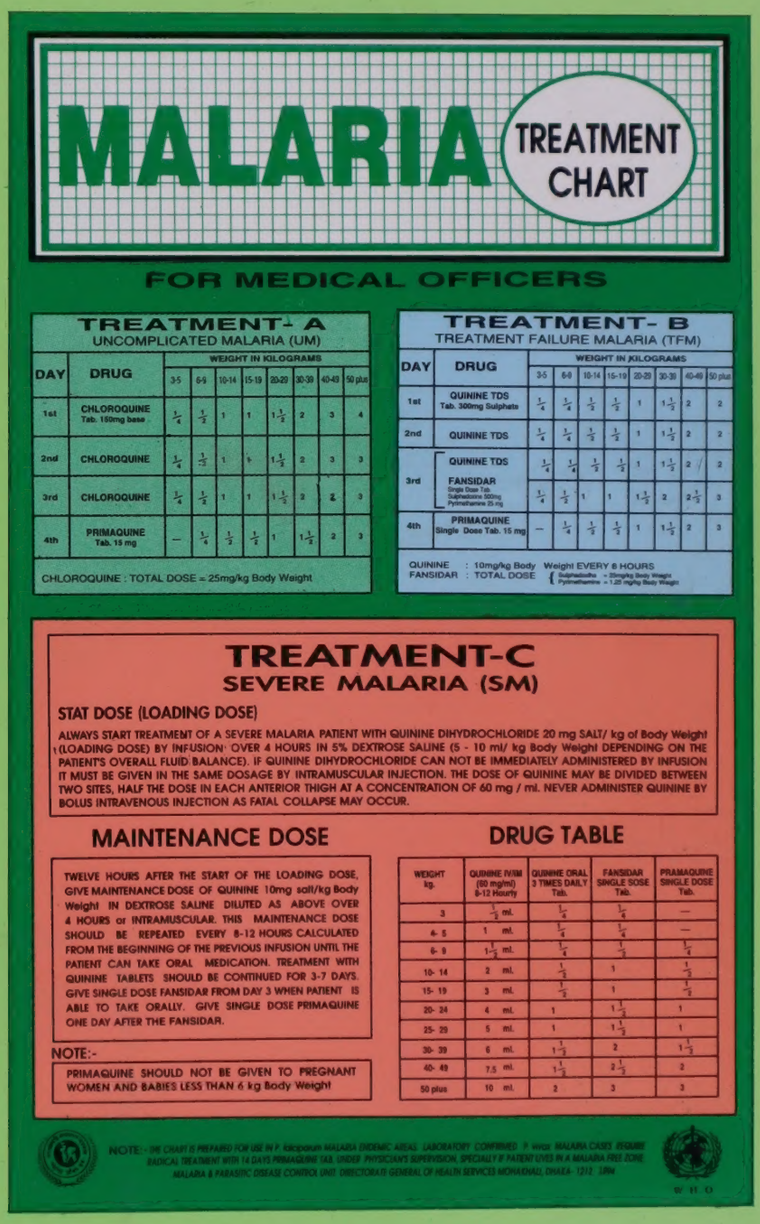
Trial Edition May 1997

MALARIA DIAGNOSTIC TREATMENT AND RECORDING CHARTS

A Training module for Medical Officers





Malaria & parasitic Disease Control unit
Directorate general of Health Services
Mohakhali, Dhaka-1212

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MALARIA DIAGNOSTIC, TREATMENT AND RECORDING CHARTS

A Training Module for Medical Officers

Malaria & Parasitic Disease Control Unit
Directorate General of Health Services
Mohakhali, Dhaka-1212

First published in 1997 by:
Malaria & Parasitic Disease Control Unit (M&PDC)
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Mohakhali, Dhaka-1212

 The first edition of this module has been printed in 1500 copies with financial contribution from the World Health Organization.

This module was developed following the printing in 1994 of two malaria wall charts to complement their technical information and provide a suitable reference document for health workers.

During the last two years numerous health professionals have contributed relevant inputs in the preparation of the first edition. Staff from the Chittagong Medical College, ICDDR,B and the DGHS have been involved. Major contributions were made by the participants of the three Malaria Workshops held in Chittagong and Cox's Bazar in 1994-95 and also in particular by:

Dr A.M. Zakir Hussain; Dr Kanak Ranjan Talukder; Dr A. Mannan Bangali; Mr N.P. Maheswary; Dr Md Abul Faiz; Dr Ridwanur Rahman; Dr Ajoy Ghosh and Dr R.M. Montanari. Also special thanks go to Mr Md. Mahbub Hossain for computer composing the manuscript.

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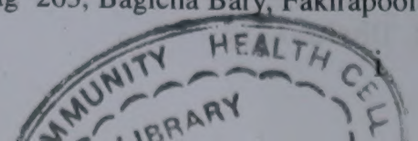


MESSAGE FROM THE DIRECTOR GENERAL

This training module is of great importance to doctors and medical assistants working in the *P. falciparum* affected areas of Bangladesh. While health workers will always be alone in their final choice of what medicines to give individual patients under their responsibility, this module provides a clear guide to standardize the approach to the Diagnosis, Treatment and Reporting of Clinical Malaria patients.

In the last ten years, the malaria situation in Bangladesh has not improved. During the 60's and 70's major DDT vector control operations were effective in controlling and eradicating malaria from parts of the country, but their cost and operational requirements have gradually escalated world wide. This has made it difficult, if not impossible to mobilize the necessary resources for vector control on a long term basis. The malaria control strategy has now been changed accordingly and the EARLY DIAGNOSIS AND PROMPT TREATMENT (EDPT) of all malaria patients has become the most important element of the revised malaria control strategy. This will ensure that those suffering from this disease will receive the best possible care this country can afford and unnecessary suffering from malaria will be reduced and deaths averted.

We are particularly concerned with the areas of the country where *P. falciparum* is present. These areas include the greater Chittagong Hill Tracts and the outbreak prone border-belt areas facing the Garo and Khasia/Jaintia forested Hill Ranges of India (Sylhet, Sunamganj, Netrokona and Mymensingh Districts). The *P. falciparum* parasite is solely responsible for malarial deaths, and severe and complicated malaria cases. Due to the continuing and increasing problem of *P. falciparum* drug resistant strains, it is now more difficult to treat malaria patients in a satisfactory way.

This module allows for a simple and practical epidemiological definition of malaria in *P. falciparum* areas. It does so with indicators based on the skills and capabilities of those treating malaria patients on a daily basis. It strengthens their knowledge and skills in the proper use of drugs and on what to do when patients do not respond properly to treatment with antimalarials. It encourages a new understanding of the malaria situation among peripheral health workers.

While in the past, for the last 30 years this understanding was the responsibility of the malaria specialized workers, it now calls for analysis, interpretation and use of malaria data at district/thana level. Simple epidemiological data are taught for use at the district/thana level. Developing a new paradigm (definition) for malaria is not easy. Our malaria situation is serious and I wish all those who are going to use this module the best of success in their endeavors.

I wish to thank those staff from the DGHS, and the WHO who assisted in the production of this module for their efforts in preparing the module for publication.

A K Nurul Anwar 3/3/97.

Prof A.K.M. Nurul Anwar
Director General of Health Services

TABLE OF CONTENTS

INTRODUCTION

Read carefully this introduction before beginning the study of the booklet.

You hold in your hands a booklet. The booklet is a part of the module.

The other parts of the module are a set of two Malaria Wall Charts (reproduced on page 2 and 3) large enough to be seen clearly when fixed to walls of outpatient departments, wards, or any conspicuous places where treatment is given for malaria.

Copies of the set of Wall Charts (there are two in each set) are included at the beginning of this booklet. However a complete module includes the booklet and at least one set of the large Wall Charts.

What is a module?

A module is a *standard unit* of learning, made up of teaching materials designed for a special purpose and with a clear set of learning objectives.

It is *standard* because it is for use by everyone working to fulfill that special purpose.

It is a *unit* because to fulfill its purpose it must be used as a whole. The parts must be used together so this booklet and the 2 Wall Charts are to be used together; one without the others will not fulfil the purpose.

Purpose of this Training Module

Clinical diagnosis of malaria, rather than definite laboratory confirmation of malaria is, and will continue to be the standard approach to initial antimalarial therapy in most parts of Bangladesh.

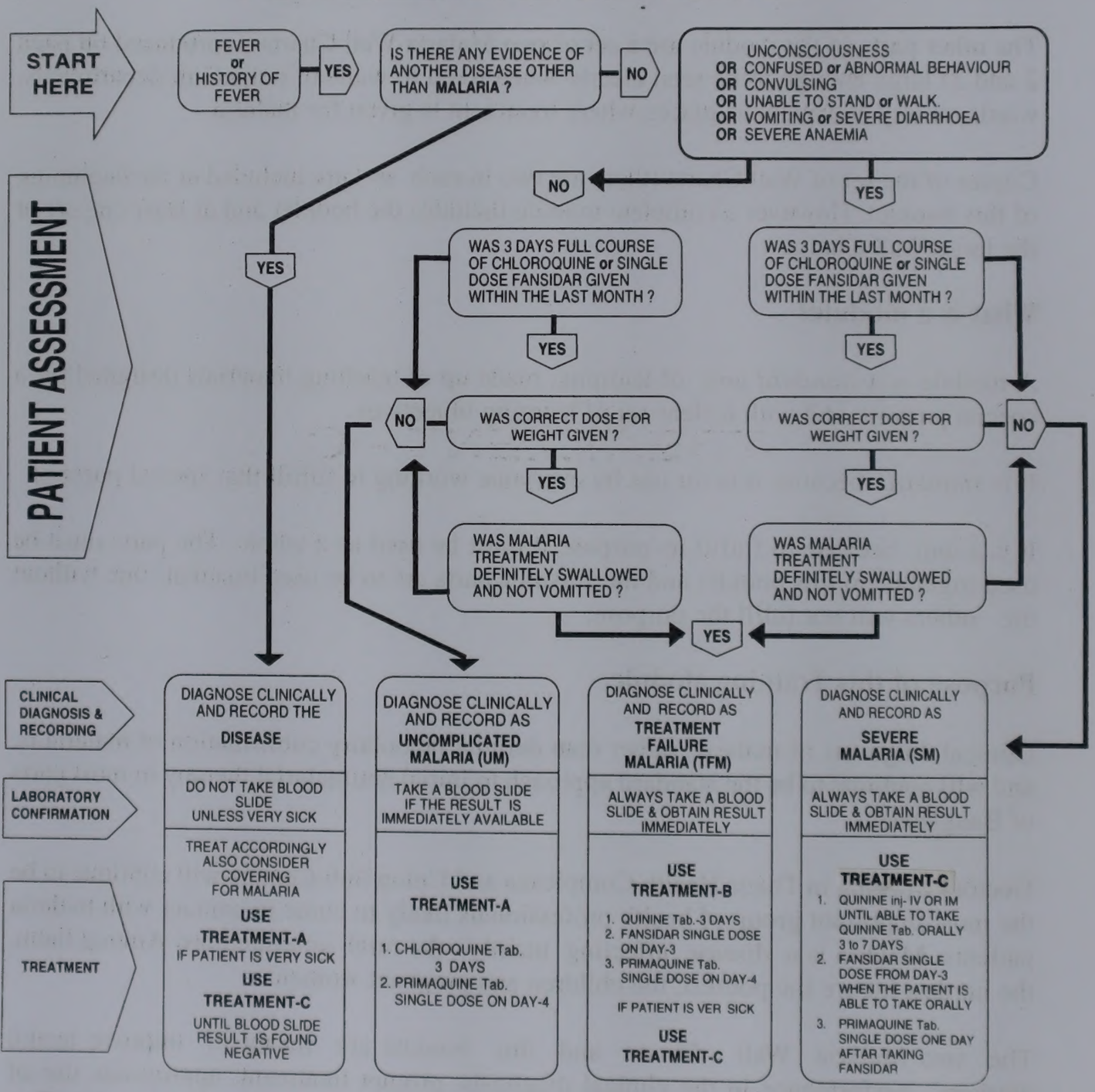
Doctors working in Thana Health Complexes and Union Sub-Centers will continue to be the most important group of health professionals likely to come in contact with malaria patients. Malaria is a disease affecting mainly the rural communities. Among them, the hardest hit are the poorest, the children and pregnant women.

The two Malaria Wall Charts and this booklet are meant to improve health workers' performance in the clinical diagnosis, prompt treatment, appropriate use of laboratory services and clear recording and reporting of malaria cases. In ANNEX-I "Planning a time table & Training course materials" you are given indications on how to organize a 3 day program using this module.

MALARIA

DIAGNOSIS AND MANAGEMENT CHART

FOR MEDICAL OFFICERS



NOTE:- *THE CHART IS PREPARED FOR USE IN P. falciparum MALARIA ENDEMIC AREAS. LABORATORY CONFIRMED P. vivax MALARIA CASES REQUIRE RADICAL TREATMENT WITH 14 DAYS PRIMAQUINE TAB. UNDER PHYSICIAN'S SUPERVISION, SPECIALLY IF PATIENT LIVES IN A MALARIA FREE ZONE.*

MALARIA & PARASITIC DISEASE CONTROL UNIT. DIRECTORATE GENERAL OF HEALTH SERVICES MOHAKHALI, DHAKA- 1212

1994

W. H. O.

MALARIA TREATMENT CHART

FOR MEDICAL OFFICERS

TREATMENT- A
UNCOMPLICATED MALARIA (UM)

DAY	DRUG	WEIGHT IN KILOGRAMS							
		3-5	6-9	10-14	15-19	20-29	30-39	40-49	50plus
1st	CHLOROQUINE Tab. 150mg base	¼	½	1	1	1½	2	3	4
2nd	CHLOROQUINE	¼	½	1	1	1½	2	3	3
3rd	CHLOROQUINE	¼	½	1	1	1½	2	2	3
4th	PRIMAQUINE Tab. 15 mg	–	¼	½	½	1	1½	2	3

CHLOROQUINE : TOTAL DOSE = 25mg/kg Body Weight

TREATMENT- B
TREATMENT FAILURE MALARIA (TFM)

DAY	DRUG	WEIGHT IN KILOGRAMS							
		3-5	6-9	10-14	15-19	20-29	30-39	40-49	50plus
1st	QUININE TDS Tab. 300mg Sulphate	¼	¼	½	½	1	1½	2	2
2nd	QUININE TDS	¼	¼	½	½	1	1½	2	2
3rd	QUININE TDS	¼	¼	½	½	1	1½	2	2
	FANSIDAR Single Dose Tab Sulphadoxine 500mg Pyrimethamine 25 mg	¼	½	1	1	1½	2	2½	3
4th	PRIMAQUINE Singe Dose Tab. 15 mg	–	¼	½	½	1	1½	2	3

QUININE : 10mg/kg Body Weight EVERY 8 HOURS
FANSIDAR : TOTAL DOSE { Sulphadoxine = 25mg/kg Body Weight; Pyrimethamine = 1.25 mg/kg Body Weight

TREATMENT - C
SEVERE MALARIA (SM)

STAT DOSE (LOADING DOSE)

ALWAYS START TREATMENT OF A SEVERE MALARIA PATIENT WITH QUININE DIHYDROCHLORIDE 20 mg SALT/ kg of Body Weight (LOADING DOSE) BY INFIUSION OVER 4 HOURS IN 5% DEXTROSE SALINE (5 - 10 ml/ kg Body Weight DEPENDING ON THE PATIENT'S OVERALL FLUID BALANCE). IF QUININE DIHYDROCHLORIDE CAN NOT BE IMMEDIATELY ADMINISTERED BY INFUSION IT MUST BE GIVEN IN THE SAME DOSAGE BY INTRAMUSCULAR INJECTION. THE DOSE OF QUININE MAY BE DIVIDED BETWEEN TWO SITES, HALF THE DOSE IN EACH ANTERIOR THIGH AT A CONCENTRATION OF 60 mg / ml. NEVER ADMINISTER QUININE BY BOLUS INTRAVENOUS INJECTION AS FATAL COLLAPSE MAY OCCUR.

MAINTENANCE DOSE

TWELVE HOURS AFTER THE START OF THE LOADING DOSE, GIVE MAINTENANCE DOSE OF QUININE 10 mg Salt / kg of Body Weight IN DEXTROSE SALINE DILUTED AS ABOVE OVER 4 HOURS or INTRAMUSCULAR. THIS MAINTENANCE DOSE SHOULD BE REPEATED EVERY 8- 12 HOURS CALCULATED FROM THE BEGINNING OF THE PREVIOUS INFUSION UNTIL THE PATIENT CAN TAKE ORAL MEDICATION. TREATMENT WITH QUININE TABLETS SHOULD BE CONTINUED FOR 3- 7 DAYS. GIVE SINGLE DOSE FANSIDAR FROM DAY 3 WHEN PATIENT IS ABLE TO TAKE ORALLY GIVE SINGLE DOSE PRIMAQUINE ONE DAY AFTER THE FANSIDAR.

NOTE :

PRIMAQUINE SHOULD NOT BE GIVEN TO PREGNANT WOMEN AND BABIES LESS THAN 6 Kg Body Weight.

DRUG TABLE

WEIGHT kg.	QUININE IV/IM (60 mg/ml) 8-12 Hourly	QUININE ORAL 3 TIMES DAILY Tab.	FANSIDAR SINGLE SOSE Tab.	PRAMAQUINE SINGLE DOSE Tab.
3	½ ml.	¼	¼	–
4- 5	1 ml.	¼	¼	–
6- 9	1½ ml.	¼	½	¼
10- 14	2 ml.	½	1	½
15- 19	3 ml.	½	1	½
20- 24	4 ml.	1	1½	1
25- 29	5 ml.	1	1½	1
30- 39	6 ml.	1½	2	1½
40- 49	7.5 ml.	1½	2½	2
50 plus	10 ml.	2	3	3

NOTE:- *THE CHART IS PREPARED FOR USE IN P. falciparum MALARIA ENDEMIC AREAS. LABORATORY CONFIRMED P. vivax MALARIA CASES REQUIRE RADICAL TREATMENT WITH 14 DAYS PRIMAQUINE TAB. UNDER PHYSICIAN'S SUPERVISION, SPECIALLY IF PATIENT LIVES IN A MALARIA FREE ZONE*

MALARIA & PARASITIC DISEASE CONTROL UNIT. DIRECTORATE GENERAL OF HEALTH SERVICES MOHAKHALI, DHAKA- 1212

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W. H. O

LEARNING OBJECTIVES

At the end of the training session, the participants should be able to:

(a) fully understand how to go through the contents of the two Malaria wall charts: MALARIA DIAGNOSIS AND MANAGEMENT WALL CHART AND MALARIA TREATMENT WALL CHART;

(b) clearly understand the clinical definitions of UNCOMPLICATED MALARIA (UM), SEVERE MALARIA (SM) and TREATMENT FAILURE MALARIA (TFM);

(c) apply their knowledge and understanding of UM, SM and TFM to their daily activities in order to:

- treat patients according to the standard treatment regimens.
- request the laboratory examination for a malaria blood slide of acceptable quality when appropriate and feasible.
- write down for each malaria patient the appropriate malaria clinical diagnosis on the register;

(d) report to the Civil Surgeon's Office the total number of each category of malaria cases and deaths as well as Malaria laboratory results as part of the Disease Profile Monthly Reporting Form and the Malaria Laboratory Form as required;

(e) analyze malaria data from the Monthly Disease Profile Reports and calculate the following rates:

- Malaria Rate (MR)
- Uncomplicated Malaria Rate (UMR)
- Treatment Failure Malaria Rate (TFMR)
- Severe Malaria Rate (SMR);

(f) identify changes in the patterns of Malaria Morbidity (MR, UM, TFM and SM Rates) and Mortality and seek help or corrective action if appropriate;

(g) check the Malaria blood slide examination results as prepared by the laboratory technician on the Laboratory Form; and

(h) collate and compile the Monthly Laboratory Report for Malaria Blood Slide Examination using the Laboratory Form.

MALARIA WALL CHARTS PRESENTATION

MALARIA DIAGNOSIS AND MANAGEMENT WALL CHART

- **Patient Assessment:**

The chart has a starting point at the top left corner, this is where, you should always start when using the chart, specially at the beginning, when you are not familiar with its contents.

Apply the same rules every time a patient comes back. This means that with each individual patient, no matter how many times he/she returns, always start from the top left corner to assess the patient. The patient assessment section takes you to four different possible diagnosis:

- Other diseases
- Uncomplicated Malaria (UM)
- Severe Malaria (SM)
- Treatment Failure Malaria (TFM)

Please note the following:

1. The first question to ask the patient is,

   - what is making you sick?

   First listen to the patient's complaints, then take a routine history and perform a routine physical examination. If you find no evidence of another disease, then ask yourself:

   - is malaria the reason for the patient's sickness?

2. When you decide that the patient's symptoms and signs suggest malaria as the main reason for the illness you must ask yourself:

   - is it Severe Malaria (SM)? **OR**
   - is it Treatment Failure Malaria (TFM)? **OR**
   - is it Uncomplicated Malaria (UM)?

   Severe Malaria needs urgent diagnosis and treatment. Decide whether the patient has severe malaria by checking for any of the clinical findings in the box:

   unconsciousness
   OR convulsion
   OR unable to stand or walk
   OR vomiting or severe diarrhoea
   OR severe pallor (anaemia)
   OR confused or abnormal behavior.

Any one or more than one of these features is a sign of severe malaria. All such patients will be treated with **Treatment-C** (Quinine, Fansidar and Primaquine). However when recording the diagnosis, it is important to find out whether the patient has already been properly treated for malaria in the past month. If this is so, then, this is also a case of Treatment Failure Malaria. To check carefully whether the patient has received a complete antimalarial course in the last month, either TREATMENT-A or TREATMENT-B ask:

- was a full course of antimalarial drugs given?', (i. e. Chloroquine or Fansidar tablets)
- was correct dose for weight given?,
- was malaria treatment definitely swallowed and not vomitted?

To be sure about these things, you have to ask the patient or guardian carefully. If the answer to <u>any</u> ofthe 3 questions about a previous antimalarial course is <u>"no"</u> then this means the course was not completed and therefore, the return of the malaria illness is not due to Treatment Failure but due to <u>inadequate treatment.</u> Such a case is recorded as severe malaria. However, if the answer to the 3 questions is <u>"yes"</u>, then this is a case of Treatment Failure Malaria and it must be <u>recorded</u> as TFM even though the patient has symptoms and signs of severe malaria and is going to be admitted.

In the same way, a patient who does not have any of the symptoms or signs of severe malaria should also be checked to find out whether he/she had a complete antimalarial treatment course in the last month by asking the same questions. If (any) of the answers is (no), then a full course was not given and so the diagnosis is recorded as Uncomplicated Malaria (UM). However, if the answer to all questions is (yes), this outpatient case is recorded as Treatment Failure Malaria (TFM). Look carefully at the PATIENT ASSESSMENT section of the MALARIA DIAGNOSIS AND MANAGEMENT CHART and see how the answers of the flow chart guide you to the correct diagnosis in each example.

We are most concerned about Treatment Failure Malaria because, if antimalarial drugs are not working well, it is dangerous not only for the sick person but for those who live around him or her. This is because the drug resistant malaria parasites will spread to other people through mosquito bites and those people will also be sick with malaria and the standard antimalarial treatment will not work. <u>Always remember to ask each malaria patient the three questions on the PATIENT ASSESSMENT section of the MALARIA DIAGNOSIS AND MANAGEMENT CHART</u> in order to make the correct diagnosis.

Always check the patient's health records if available, to confirm the patient's history.

- **Clinical Diagnosis and Recording:**

Clinical malaria is defined as UM, SM and TFM. Other diseases should be recognized and recorded as is common practice in your District. This diagnostic classification serves

two purposes: the first is to provide an appropriate treatment to all malaria patients, the second to provide useful epidemiological data through the recording and reporting of the clinically diagnosed malaria cases. This purpose is very important to the malaria control program in Bangladesh for the monitoring and surveillance of this disease.

The main objective of the malaria control program in Bangladesh is to limit and reduce morbidity and mortality due to malaria. The epidemiological priority is, therefore, to obtain data in a timely fashion on the incidence and distribution of malaria illnesses and deaths in the population.

Clinical malaria cases according to the UM/SM/TFM classification allows for a reporting syste to be developed that makes use of clinically diagnosed cases of malaria in the evaluation of the overall malaria situation.

TFM and Drug Resistant Malaria

The clinical diagnosis of TFM relates to the efficacy of treatment defined by the clinical response. This information is the most important and useful information to guide us in the definition and regular assessment of our antimalarial drug policy. Additional, useful informetion and specific information comes from in vivo and in vitro tests of antimalarial drugs. These are special laboratory tests. This information (to be collected by DGHS staff if required) measures the success of the treatment in relation to the effect on the parasites in the patient's blood (parasite response).

When carrying out in vivo/in vitro tests, we talk about Drug Resistant Malaria (related to the parasite). Remember that at present only P. falciparum malaria infections out of the four species of malaria parasites are considered responsible for TFM cases and Drug Resistant Malaria.

When diagnosing clinical malaria as TFM, we take into account the patient (clinical) response only. All TFM cases are patients coming back who have already been recorded, within a month before the second visit, as UM or SM cases. This means that in these cases the one malarial infection will be counted twice, first as UM or SM and then as TFM. This double counting cannot be avoided and does not seriously affect interpretation of epidemiological data.

Most TFM cases are likely to have been first diagnosed as UM cases, which means that no malaria blood slides were taken the first time and we do not have a laboratory result from the first malaria clinical episode.

Results from malaria blood slides collected from TFM cases need therefore to be considered as an indication of a malaria treatment problem but not a definite proof. We cannot be sure of the time the patient got the malaria parasite first. During one month the same patient may have become sick with two different malaria parasites coming from two different mosquitos (this is not common but possible). The patient may have been

successfully treated first time and become sick again after having been bitten by a malaria infective mosquito a second time. There is no way we can find the truth without special investigations being carried out (in vivo tests).
One person can have a good understanding of the local TFM situation by regular classification, recording and analysis of monthly TFM cases (see page 17 and Exercise 2 page 19).

- **Laboratory Confirmation:**

Malaria blood slide examination should serve the main purpose to help in the correct diagnosis and treatment of individual patients. Therefore blood slides should be collected only when the results can be made available for the benefit of those suffering from the disease.

Malaria blood slides, if laboratory services are available, should be collected from:

- all SM cases (to confirm the diagnosis)
- all TFM cases (to confirm the diagnosis)
- all admitted and very sick patient (for differential diagnosis).

Please note that some of the malaria blood slides collected will originate from patients referred from Health Assistants (HA) at the village level. Severe Malaria patients first seen by HA should always be referred with a malaria blood slide and after receiving treatment with stat dose Quinine Intramuscular given by the HA.

Under special circumstances (during epidemic outbreaks of malaria in the border areas for example) special Mass Blood surveys will be carried out. If this be the case however, those involved will receive special instructions.

Medical personnel, including doctors should be able to train Health Assistants in the correct preparation (under field conditions) of a thick and thin blood film on the same slide and each, of good enough quality for malaria microscopy.

For this reason in Annex-II you are given a special learning unit taken from the WHO Module "Basic Malaria Microscopy". You will refer to Annex-II during the practical session on Malaria Films included in this training program.

<u>The Work of the Laboratory Technicians</u>

In many THCs, the Laboratory Technician will be responsible for laboratory examinations of malaria blood slides. He/she will also perform other basic laboratory examinations (e.g. TB and Leprosy smears). The TH&FPOs/MOs are expected to be their first line supervisors.

Laboratory Technicians should be informed that following the introduction of the Malaria Clinical Case definitions, medical personnel requesting Blood Film examinations for malaria parasites will specify in their Malaria Laboratory request slip,

when a malaria patient is diagnosed as a UM, SM or TFM case.
The Laboratory Technicians should write the clinical diagnosis given by the medical personnel requesting the laboratory examination, in the Remarks Column of the laboratory reporting form.

The Laboratory Reporting Form should be checked by the TH&FPO at least once a month, so as to compare or correlate the number of slides examined for UM, SM and TFM cases and the number of positive slides for each category. This will indicate the capability of the staff to provide a reliable clinical diagnosis for clinical malaria cases (provided the laboratory results are correct).

If the comparison is poor and the number of TFM/SM positive slides is not close to the number of clinically diagnosed TFM/SM cases, there is either a laboratory problem or a clinical problem that requires attention.

Remember that this kind of comparison or correlation is a "rough" one. It is not meant to give exact figures but to help understand which way you are going in relation to the malaria problem and the quality of care in your health institution.

For each individual patient, the final diagnosis following results from the laboratory examination, rests with the treating physician.

- **Treatment:**

The chart emphasizes treatment as <u>being separate</u> from the diagnosis and recording of clinically diagnosed malaria cases.

Given the level of malaria endemicity in *P. Falciparum* areas of Bangladesh, (greater Chittagong Hill Tracts Districts and Northern Border Belt areas) <u>all</u> fever cases or very sick patients coming for treatment may also be given a full course of standard antimalarial drugs: Treatment-A for those with minor disease (Outpatients) and Treatment-B for all very sick patients (Admissions), depending on the treating physician.

In P. falciparum areas treatment for malaria is therefore given to a higher number of patients than those officially <u>reported</u> as UM, TFM, SM malaria cases.

The main reason for this policy is because people may have the *P. falciparum* parasite in their blood without being sick with malaria. This happens to those living in *P. falciparum* areas when the body's defenses (immune system) become strong against the malaria parasite. However, when such a person becomes ill with another disease (e.g. pneumonia), the malaria parasites in that person can grow stronger because the body defenses are busy fighting the new disease instead of keeping malaria parasites under control. Patients reporting to your health institution may be in this situation and malaria treatment is recommended as additional protection, especially to children and pregnant women coming to your health institution for treatment of diseases other than malaria.

At Ward/Village level (Health Assistant level), only Treatment-A is available. For Severe Malaria cases Health Assistants (HAs) and other field workers are being trained to take a malaria blood slide and give the patient Quinine IM stat. dose prior to referral to a hospital. The patient should always be referred with the malaria blood slide for laboratory confirmation of the malaria parasite.

If referral is impossible and under special circumstances (e.g. malaria outbreaks) the HAs are trained to give Quinine Dihydrochloride 10 mg Salt/kg Body Weight I.M. twice a day for a maximum of 6 doses (3 days). If the patient's condition improves he/she should be given a full course of Chloroquine orally (3 days). This under field conditions, is considered to be the best possible solution. HAs and field staff working in Temporary Treatment Centers (TTCs) can only initiate Treatment-C as drugs available at this level do not include Quinine tabs and Fansidar

Remember to teach your HAs that if a patient comes back with UM he/she may repeat Treatment-A once within four weeks from start of Treatment-A, but if the patient comes back more than once then she/he must be referred to the THC. Clinical history taking at HA level or in TTCs is important in order to be able to do this properly. Primaquine tablets should always be made available at these levels.

MALARIA TREATMENT WALL CHART

The MALARIA TREATMENT WALL CHART should always go together with the MALARIA DIAGNOSIS AND MANAGEMENT CHART.

The MALARIA TREATMENT CHART explains more clearly the difference between Treatment-A and Treatment-B and details the major drug combinations.

- **Use of Primaquine:**

  Please note that Primaquine is given in both Treatment-A and Treatment-B **to stop the cycle of transmission of malaria back to mosquitos**. It is a special drug that destroys those parasites *(P. falciparum gametocytes)* that, if picked up by a mosquito sucking blood, will allow the mosquito to transmit malaria to somebody else. The *gametocytes* are the sexual forms of the parasites. There are male and female *gametocytes*. Presence of these types of parasites do not cause sickness in the human being. All four types of malarial parasites have sexual forms *(gametocytes);* however only *P. falciparum game ocytes* are not destroyed by current antimalarials such as Chloroquine, Quinine or Fansidar.

  Single dose Primaquine is therefore added to Treatments-A and-B only to get rid of those special parasite forms called *P. falciparum gametocytes*. If a patient has a blood slide that is positive for P.f.G. (gametocytes) only, that patient should be given an additional single dose of Primaquine to get rid of the *gametocytes*. These *gametocytes* are the "left over" of a previous malaria infection. *Gametocytes* alone do not give fever and are not responsible for malaria clinical attacks.

  Very important: Single dose Primaquine should not be given to pregnant women and babies less than 6 Kg body weight.

- **The Use of Primaquine in P. vivax Infections:**

  If a blood slide is found to be positive for *P. vivax*, Primaquine can be given daily for 14 days for treatment of the liver stage of the *P. vivax* parasite (relapse forms). However, the treatment is long, potentially dangerous, unpleasant and reinfection possible. There is no place for a standard 14 day's Primaquine treatment of *P. vivax* infections in areas with a lot of malaria (high endemicity) such as the rural areas of Greater Chittagong Hill Tracts Districts. The decision to give such treatment should be made on an individual basis by a doctor only.

- **The Use of Fansidar and Quinine:**

  The use of Quinine and Fansidar in combination under Treatment-B should always be maintained. For no reasons should Fansidar be given alone.

  Fansidar must never be used alone to treat malaria infections because this will increase

the possibility that the parasites will become resistant to the drug. Fansidar and Primaquine tablets should be best given on day 3 or day 4 of treatment.

- **TFM following a full correct Treatment-B course:**

It may also happen that one may see a patient who has a recent history of receiving a full Treatment-B course (Quinine, Fansidar, Primaquine). This patient may be returning back within a month (from receiving Treatment-B) feeling sick with malaria.

In this case if possible, always check the slide result from the time he first received Treatment-B (there should be one) and verify if the slide was positive. Then try to question the patient as thoroughly as possible about the number of tablets taken and the time he/she has taken them. Make sure all possible mistakes or inconsistencies are examined. At the end, however, take another blood slide (if O.P.D. make sure you check results later even if patient does not come back), repeat Treatment-B and record as TFM (Treatment-B). If 2 or 3 of these patients come to your attention in a month, make sure you send a note about this attached to the revised Disease Profile Monthly Reporting form (see page-29 Annex-III) to your Civil Surgeon Office. This is very important information and needs to be carefully investigated.

- **Cost of Treatment:**

At present a full adult Treatment-A course costs Tk.8.00, while a full adult Treatment-B course costs the MOHFW Tk. 52.00, which means seven times as much! Any alternative treatment course with new antimalarial drugs may, if required, be as much as 4 times more expensive than a Treatment-B course (i.e. Tk.200.00). There are no new inexpensive antimalarial drugs available on the market.

- **Care in giving Drugs:**

When administering drugs, remember that if the patient vomits the tablets, soon after taking them, the treatment dose should be repeated. Side effects (e.g. itching) should be dealt with appropriately.

Always request a patient to come back as soon as possible if he/she feels worse or if the patient is not improving following completion of treatment. Remember that only *P. falciparum* malaria is capable of causing cerebral malaria and death.

PRACTICE AT USING THE MALARIA DIAGNOSTIC AND TREATMENT CHARTS FOR MEDICAL OFFICERS

EXERCISE 1 (Case Studies)

(This exercise should be carried out in a small group session. Discuss it in groups of 3-5. You have 60 minutes to go through it. At the end of this exercise check and review your answers with your facilitator.)

Steps to follow:

(a) Read carefully the Patient's Clinical History No. 1 and the questions you have to answer. Next study your copy of the Malaria Diagnostic and Treatment Charts for Medical Officers and use it to decide which are the correct answers.

(b) Discuss your answers with your group and write them down.

(c) Repeat same steps as (a) and (b) for the Patient's Clinical History No. 2.

Patient's Clinical History No. 1

Mallika has come from a village 10 Km from Teknaf THC, in Cox's Bazar District. She is 22 years old. She is married with one child and in her 30th week of her second pregnancy.

She has reported to the outpatient clinic of the THC on Monday late in the morning. She looks very pale and very tired. She needs to sit down and has been sick for the last 3 weeks. During the last two days she has vomitted (twice) and at the time of the visit, she also complains of a severe headache.

The health staff who has examined her has recorded a temperature of 38.7^{o}C, pulse 105 regular, B.P. 115/80 mm/Hg, weight 51kg. The chest is clear and there is no history of blood loss or risk factors associated with her second pregnancy. Her spleen is not palpable.

Mallika has no other symptoms and she has attended the antenatal clinic twice already. She has taken Chloroquine Prophylaxis (2 tabs weekly) for the last four months and has been immunized for tetanus.

She has told the examining health staff that three weeks ago, when she first felt sick with fever, she went to see the local Health Assistant and was given 4 tabs of Chloroquine (150 mg base) on day 1 and 3 tabs of Chloroquine on day 2 and 3. She remembers taking all the tablets with no side effects. Mallika home is 2 hours walk from the THC and the examining health staff has suggested that she should be admitted.

Questions	Answers
1. Was 3 days course of malaria treatment given within one month ?	
2. Was correct dose for weight given ?	
3. Was malaria treatment definitely swallowed and not vomitted	
4. What is your diagnosis ?	
5. Do you wish to admit the patient ?	
6. Is a malaria blood slide required ?	
7. Which Malaria Treatment Regimen would you give the patient ?	
8. Write the full antimalarial treatment course to give the patient.	

9.Write your comments on Patient No. 1:

Patient's Clinical History No. 2

Master Elias is a 4 years old boy from a small village near Lama THC, in Banderban District.

He was brought by his mother to the THC on a Friday afternoon. Elias has a hot skin, a running nose and is coughing. The mother has reported that Elias has been coughing for the last four days. He was feeding well but he had vomitted twice because of the cough. He has not slept well for the last two nights and at the time of the visit he is not breathing properly.

On examination the health staff has found that his weight is 14 kgs, his temperature 38^{O}C, that he has fast breathing (48 per minute) with chest indrawing and looks tired. Elias also has a slightly enlarged spleen.

His mother has reported that he has not received any treatment. Elias has been fully immunized and he was last seen at the THC 6 months ago for a skin infection. At that time he was given Amoxicillin oral 3 times daily for 5 days and Chloroquine 1(one) tab daily for three days.

Questions	Answers
1. Was 3 days course of malaria treatment given within one month ?	
2. Was correct dose for weight given ?	
3. Was malaria treatment definitely swallowed and not vomitted	
4. What is your diagnosis ?	
5. Do you wish to admit the patient ?	
6 Is malaria blood slide required ?	
7. Which Malaria Treatment Regimen would you give the patient ?	
8. Write the full antimalarial treatment course to give the patient.	

9. Write your comments on Patient No. 2:

NOTES ON THE MALARIA COMPONENT OF THE DISEASE PROFILE MONTHLY REPORTING FORM (DPRF) AND RELATED MALARIA RATES

Following the introduction of the three malaria clinical classifications, UM, SM and TFM, the Disease Profile Monthly Reporting Form has been changed in order to include the three malaria clinical case categories. A copy of the revised form is attached for your review.

A brief explanation is now given for each of the new malaria rates/indicators derived from the three malaria clinical classifications.

A. MALARIA RATE/1000 POPULATION (MR/1000)

$$\text{MR/1000} = \frac{\text{Total No. of Malaria Cases}^2}{\text{Total Population}} \times 1000$$

This rate per thousand population looks at the number of sick people seen every month at your health institution who are diagnosed as being sick because of malaria over the total number of people living in the area served by your health institution. We know that many patients seen at the community level are not included, and there will be a certain amount of under reporting.

This rate however will give you every month an indication of the amount of malaria causing sickness among the population of your health institution (e.g. Thana Health Complex). The population (i.e. the denominator) of your Thana Health Complex should consider both the Thana Population (official figure) + the Catchment Area Population = Total Population.

Information for action

If you graph this information month by month you will be able to detect changes in the Malaria situation of the area served by your health institution. If a noticeable increase in your Malaria Rate is observed from one month to the other, try to identify the geographical area where the patients come from. Involve your field workers (e.g. Health Assistants), inform your supervisor and seek advice from your District Civil Surgeon Office.

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[2] Total number of Malaria cases = UM cases + TFM cases + SM cases, (ref. Disease Profile Monthly Reporting Form).

B. UNCOMPLICATED MALARIA RATE (UMR)

$$\text{UMR} = \frac{\text{No. of UM Cases}}{\text{Total No. of Malaria Cases}^2} \times 100$$

This rate gives you, as a percentage, the proportion of sick people seen at your health institution who are diagnosed as being sick because of Uncomplicated Malaria.

This is the mild form of the disease and this kind of patient is only supposed to be treated as outpatient. UM patients are expected to be the majority of malaria patients. In fact those health institutions reporting a high UMR (e.g. 85%) are the ones where treatment of patients is most satisfactory and the disease causes least suffering and problems.

C. TREATMENT FAILURE MALARIA RATE (TFMR)

$$\text{TFMR} = \frac{\text{No. of TFM Cases}}{\text{Total No. of Malaria Cases}} \times 100$$

This rate gives you, as a percentage, the proportion of sick people seen at your health institution who are diagnosed as being sick because of TFM. These patients are those who come back within a month after receiving a full course of anti-malarials.

Information for action

The TFM rate is very important because it gives you an indication of how serious is the problem of drug resistant malaria among the people living in your area. If you compare your TFM Rate month by month you will be able to notice changes and understand if the TFM situation is stable, improving or getting worse.

TFM patients can be both Outpatients or Inpatients. In addition to calculating the TFM rate you should also check and compare your monthly actual number of TFM cases recorded as Inpatients and Outpatients. An increase in the number of TFM cases recorded as Inpatients is a very serious situation. It tells you that your malaria patients are coming back for additional treatment and are coming back in a serious condition that requires admission! This situation is serious and you need additional help to investigate what is happening. Inform your supervisor and seek advice from your Civil Surgeon Office.

D. SEVERE MALARIA RATE (SMR)

$$SMR = \frac{\text{No. of SM Cases (inpatients)}}{\text{Total No. of Malaria Cases}} \times 100$$

This rate gives you, as a percentage, the proportion of very sick people admitted into your health institution who are diagnosed as being sick because of Severe Malaria.

Information for action

Whenever this rate goes up you may expect deaths due to malaria also to increase. You may be facing a new very serious situation and this finding requires your urgent attention. Inform your supervisor and seek advice from your Civil Surgeon Office. Also try to find out more about those patients:

- **Who are those people becoming sick?**
- **How old are they?**
- **Where do they come from?**
- **Is the Malaria Rate also going up?**
- **Is this a malaria outbreak?**

NOTE: You should remember that the percentage sum of the three rates always gives you a total of 100% (for example, UMR 80% + TFMR 18% + SMR 2% = 100%)

E. MALARIA WORK-LOAD (MW)

In addition to the above rates, you may wish to have a better idea of the amount of time and work required by the health staff in your health institution to look after malaria patients. You can do that by calculating the monthly Malaria Word-Load as follows:

$$MW = \frac{\text{Total No. of Malaria Cases}}{\text{Total Outpatients + Total Inpatients}} \times 100$$

The Malaria Work-Load gives you as a percentage the proportion of malaria cases seen at your health institution out of the total number of patients seen. For example, if the Malaria Work-Load is 33%, this means that one third of the time and work of the health staff in your health institution goes toward the care of people sick with malaria.

CLINICAL MALARIA RATES
(From Disease Profile Monthly Reports)

EXERCISE 2

(This exercise should be carried out by yourself. You have 40 minutes to go through it. At the end of this exercise check and review your answers with your facilitator.)

Steps to follow:

(a) Go through the 1992 Tamu THC Monthly Clinical Malaria Data Chart compiled from the Disease Profile Monthly Reports, on the next page.

(b) Review carefully the information presented on how to calculate malaria rates on pages 16-18 and calculate the 8 missing Malaria Rates. Write them down onto the appropriate columns/boxes in the Exercise Sheet Table on page 20.

(c) Go to page 21 where the Malaria Rates are displayed in graphic and table form. Transfer the 8 missing Malaria Rates you have calculated onto the table below the graph and plot/chart them onto the graph. (Please note that data for UMR, TFMR and SMR rates are plotted on the Y_2 axis on a log scale. This is done to facilitate the interpretation of results across time).

(d) Write down below your interpretation and conclusions based on your trend analysis of the complete set of Malaria Rates and prepare yourself for the plenary discussion.

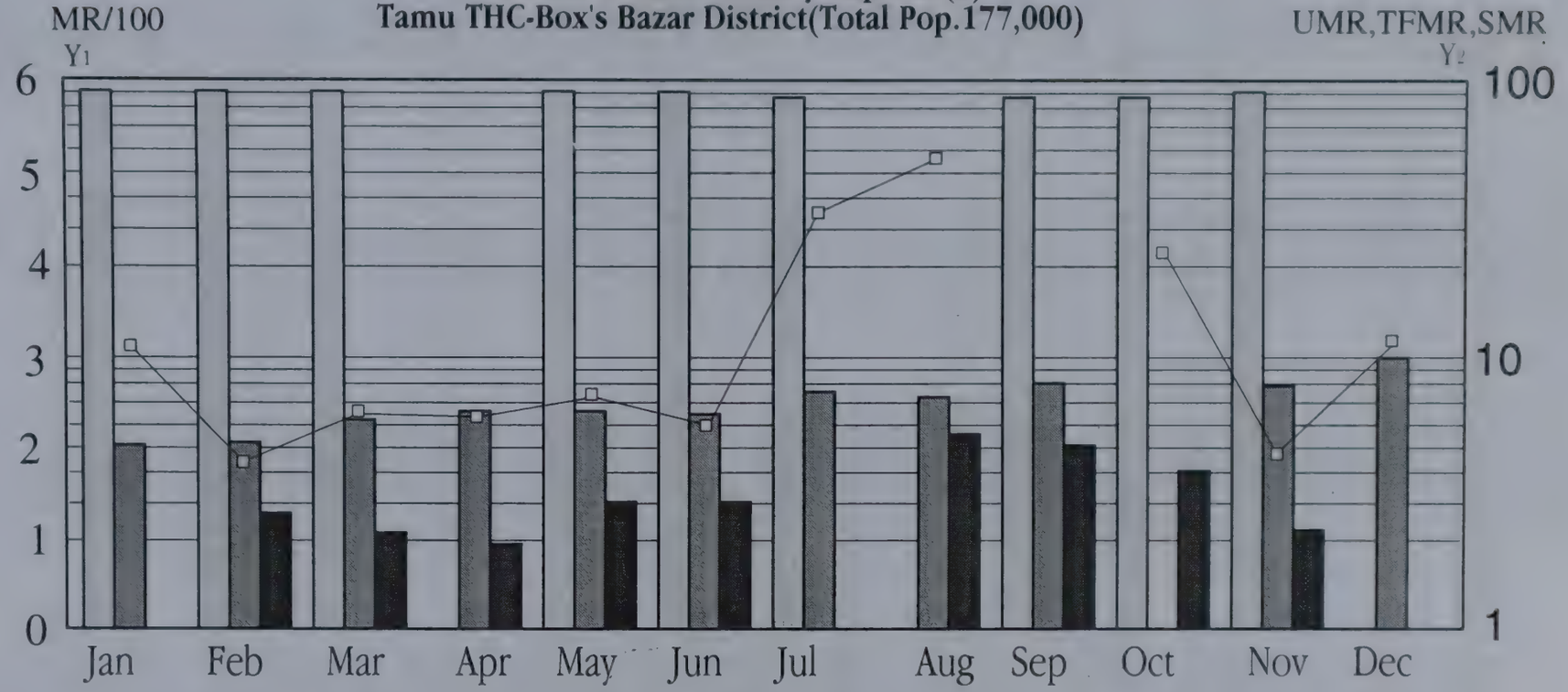
EXERCISE SHEET

1992 CLINICAL MALARIA DATA/RATES
FROM DISEASE PROFILE MONTHLY REPORTS
TAMU THC-COX'S BAZAR DISTRICT-TOTAL POP. 177,000

Month	Total # of patients	# of cases U.M.	# of cases T. F. M.	# of cases S. M.	Total # of Malaria cases	M.R./ 1000	U.M. Rate %	T.F.M. Rate %	S.M. Rate %	# of deaths due to Malaria
Jan.	6,066	497	27	21	545	3.1	91.2%	5.0%		Nil
Feb.	4,972	320	18	10	348	1.9	92.0%	5.2%	2.8%	Nil
Mar.	6,176	397	26	9	432	2.4	91.9%	6.0%	2.1%	Nil
Apr.	6,123	392	28	8	428	2.4		6.5%	1.9%	1
May	7,777	422	30	14	466	2.6	90.6%	6.4%	3.0%	NIl
Jun.	6,108	384	30	13	427	2.4	90.0%	7.0%	3.0%	Nil
Jul.	6,873	721	62	41	824	4.6	87.5%	7.5%		2
Aug.	6,757	823	70	52	945	5.3		7.4%	5.5%	1
Sep.	9,280	888	81	51	1,020		87.1%	7.9%	5.0%	1
Oct.	7,875	658	64	29	751	4.2	87.6%		3.9%	Nil
Nov.	5,261	330	30	8	368	2.0	89.7%	8.1%	2.2%	Nil
Dec.	5,092	496	57	19	572	3.2		10.0%		1
Total	78,360	6,328	523	275	7,126	38.7		7.3%	3.9%	6

1992 Clinical Malaria Data Rates

Disease Profile Monthly Reports (3)
Tamu THC-Box's Bazar District(Total Pop.177,000)



MR/1000	3.1	1.9	2.4	2.4	2.6	2.4	4.6	5.3		4.2	2	3.2
UMR	91.2	92	91.9		90.6	90	87.5		87.1	87.6	89.7	
TFMR	5	5.2	6	6.5	6.4	7	7.5	7.4	7.9		8.1	10
SMR		2.8	2.1	1.9	3	3		5.5	5	3.9	2.2	

MR/1000 UMR TFMR SMR

MR/1000= Maliria Rate/1000 Pop. UMR- Uncomplicated Malaria Rate TFMR= Treatment Failure Malaria Rate
SMR= Severe Malaria Rate

Planning a Time Table and Course Organization

This is a set of notes on how to organize and prepare for a training session.

- **Materials required:**

  Each participant should be given one copy of this booklet and one copy of each of the two wall charts: Malaria Diagnosis and Management Chart and Malaria Treatment Chart.

  Additional materials may include a note book, pencils and a pocket calculator to use for calculating the malaria rates.

  Also an adequate number of cleaned slides, sterile lancets, methylated spirit, and cotton wool is required to practice the preparation of thick and thin films for malaria microscopy (see Annex II).

- **Planning for the three day's workshop:**

  The ideal number of participants is 20-25 with 1-2 facilitators. This training program attempts to involve, as much as possible, the participants themselves. This is called participatory training. The facilitators or organizers should allow the participants to present all topics in the module according to the time table attached as a sample on page 23. A set sequence of events is prepared for every major topic included in the booklet:

  1. Reading the Materials;

  2. Group Discussion or Introduction/Presentation followed by Discussion; and

  3. Conclusion of the Topic.

  Every step should be time limited and should encourage individual contributions from as many different participants as there are opportunities. In total at least 15 different "opportunities" are included in the time table.

  In order to exploit all of them the course organizer needs to:

  1. Obtain a full list with the names of all the participants

  2. At the beginning of the course, allocate against each empty space in the time table (i.e. Introduction, Presentation, Conclusion) a different participants' name.

  Also for each day a different chairman may be selected among the participants for the smooth running of each session and in particular of the group discussions.

TRAINING OF MEDICAL OFFICERS ON CLINICAL AND LABORATORY DIAGNOSIS, TREATMENT AND REPORTING OF MALARIA CASES

VENUE:_____ TIME:_____

TIME TABLE

Time	Day I - Date:	Day II - Date:	Day III - Date:
09:00	● Registration & Opening (60') ● Participant's Pre-Test (30') ● Introduction of Training Program ● Distribution of the training materials ● Selection of Day Chairman (30')	● Selection of Day Chairman ● - Session II - Plenary Work : (Subject Session II) Introduction: Speaker of Group I (15') Presentation: Speaker of Group II (30') Discussion: All prticipants (60') Conclusion: Speaker of Group II (15')	● Selection of Day Chairman ● - Session IV - Individual Work: (Exercise 2) (40') ● - Session IV - Plenary work : (Subject Session IV) Introduction (5') Presentation (20') Discussion (35') Conclusion (20')
11:00-11:30	BREAK	BREAK	BREAK
11:300	● - Session I- Reading Session Subject: ``Learning Objectives and Malaria Diagnosis & Management Wall Chart.''(30') ● - Session I- Plenary work : (Subject Session I) Introduction (5') Presentation (15') Discussion (30') Conclusion (10')	● - Session II- Reading Session Subject : ``Exercise 1, Case Studies, Patient 1 & 2'' (60') ● - Session III - Plenary Work : (Subject Session III, Patient No 1) Introduction: Speaker of Group I (5') Presentation: Speaker of Group II (10') Discussion: All participants (10') Conclusion: Speaker of Group III (5')	● - Session V- Plenary work : (Subject Session V) ``Annex II: Preparation of thick and thin blood films for Malaria microscopy'' Group Practice (60') ● Post Test (30')
13:00-14:00	LUNCH&PRAYER	LUNCH&PRAYER	LUNCH&PRAYER
14:00-15:00 15:0016:00	● Session II - Reading Session Subject : ``Malaria Treatment Wall Chart'' (60') ● - Session II - Group Work : (Subject Session II) Creation of three Working Groups, Group Discussion (60')	● - Session III - Plenary Work : (Subject Session II, Patient No 2) Introduction: Speaker of Group I (5') Presentation: Speaker of Group II (10') Discussion: All participants (10') Conclusion: Speaker of Group III (5') ● - Session IV - Reading Session Subject: ``Notes on the malaria component of the DPRF & Malaria Rates'' and Exercise 2 (Clinical Malaria Rates)'' (60')	● Training Program Evaluation Questionnaire (30') General Discussion and Final Review (30') Closing Session (60')

Facilitators of the course should expect many questions. They should be familiar with the subject and complement the information given in this booklet with information from other sources in order to answer all questions in the most satisfactory way.

A separate pre-and post-test questionnaire as well as an evaluation questionnaire can be requested at the following address:

Attention: Deputy Director (M&PDC Unit)
Directorate General of Health Services
Mohakhali, Dhaka-1212

The use of the pre-and post-test is very important to give the organizers an indication of the need for this type of training before the starting of the training program, (through the pre-test) and to measure the successful achievement of the learning objectives at the end (through the post-test). The pre-test has to be given before the distribution of the training materials.

The Workshop evaluation questionnaire when used, will give a more general indication on the success or failure of the training program and in particular if the program has been up to the expectations of the participants.

Preparation of Thick and Thin Blood Films for Malaria Microscopy[3]

Learning Objectives

By the end of this Unit you should be able to:

- name the diseases that can be transmitted by contaminated blood
- list the precautions that must be taken to prevent contamination
- list all the materials required for making blood films
- demonstrate under field conditions the preparation on the same slide of a thick and a thin blood film, each of good enough quality for malaria microscopy
- explain the reasons why a blood film should be correctly labelled
- demonstrate the correct labelling of blood films
- recognize and select thick and thin blood films of good quality
- identify the causes of common faults in both thick and thin blood films

Diseases carried in the blood

Some people may carry a disease in their blood even if they do not appear to be ill. You cannot easily see the diseases in the blood, and sometimes the tests to demonstrate the diseases are very complicated. The principal diseases are:

- Hepatitis
- Acquired Immuno Deficiency Syndrome (AIDS)
- Malaria

The collection and handling of blood samples presents a potential risk of blood from a patient infected with one of these diseases accidentally contaminating another patient or a health worker. However, this risk can be reduced to a negligible minimum by taking the following precautions:

- Wear protective gloves when handling blood or taking blood samples.
- Avoid getting blood, including that from unstained slides, on your fingers or hands.

[3] From: **Basic Malaria Microscopy,** Part I, pp 17-18, Learner's Guide, WHO, 1991

- Cover any cuts or abrasions on your hands with adhesive dressings.
- Take care not to prick yourself or others with any sharp instrument that has been in contact with blood.
- Never use disposable lancets more than once.
- Always wash your hands with soap and water after completing any task that involves the handling of blood.
- If blood does get on to your skin, wipe it off quickly with cotton wool dampened with alcohol and wash the affected area with soap and water as soon as possible.
- Any materials contaminated with blood, such as lancets, cotton swabs and discarded slides, should be boiled for 20 minutes, or placed in a solution of bleach or sodium hypochlorite (available chlorine level 10 000 parts per million), then disposed of safely by burial or incineration.

Kinds of blood film

Two kinds of blood film - thick and thin - are used in malaria microscopy.

Thin film

The thin film consists of a single layer of red blood cells and is always used as a label to identify the patient. It is sometimes used to assist in the identification of the malaria species, after the parasites have been seen in the thick film.

Thick film

The thick film is made up of large numbers of dehaemoglobinized red blood cells. Any parasites present are concentrated in a smaller area than in the thin film and so are more quickly seen under the microscope.

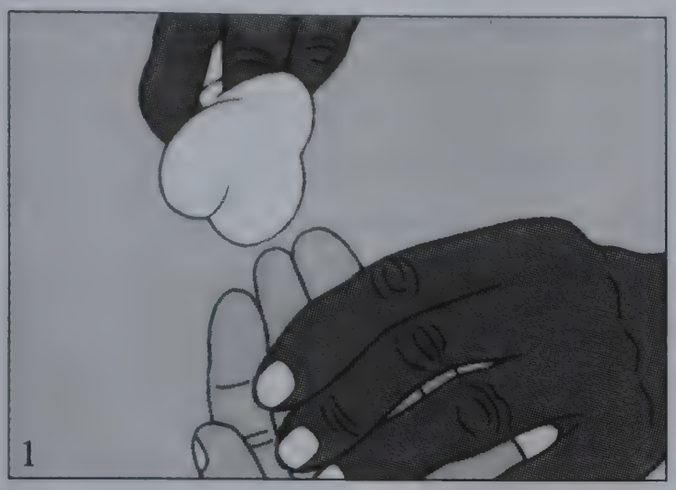
Preparation of thick and thin blood films on the same slide

The following items are needed for preparation of blood films:

- cleaned and wrapped slides
- sterile lancets
- methylated spirit and water
- absorbent cotton wool
- slide box (or a cover to keep flies and dust off the slides)
- clean, lint-free cotton cloth
- record form or register.

Plate 1. Preparation of thick and thin blood films on the same slide

After details about the patient have been recorded in the appropriate form or register, the blood films are made as follows:



1 Holding the patient's left hand palm upwards, select the third finger from the thumb. (The big toe can be used with infants. The thumb should never be used for adults or children).

Clean the finger with a piece of cotton wool lightly soaked in alcohol, using firm strokes to remove dirt and grease from the ball of the finger.

Dry the finger with a clean cotton cloth, using firm strokes to stimulate blood circulation.

2. Puncture the ball of the finger with a sterile lancet, using a quick rolling action.

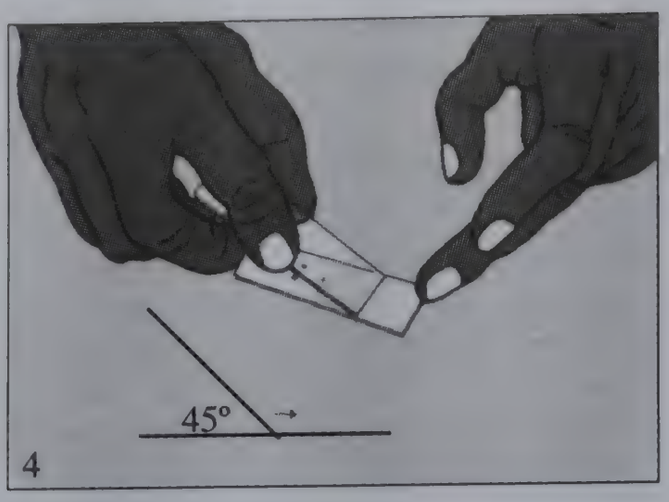
Apply gentle pressure to the finger to express the first drop of blood an wipe it away with a dry piece of cotton wool. Make sure that no strands of cotton remain on the finger to be later mixed with the blood.

3. Working quickly and handling clean slides only by the edges, collect the blood as follows.

Apply gentle pressure to the finger and collect a single small drop of blood, about this size •, on the middle of the slide. This is for the thin film.

Apply further pressure to express more blood and collect two or three larger drops, about this size ●, on the slide, about 1 cm from the drop intended for the thin film (see illustration).

Wipe the remaining blood away from the finger with a piece of cotton wool.



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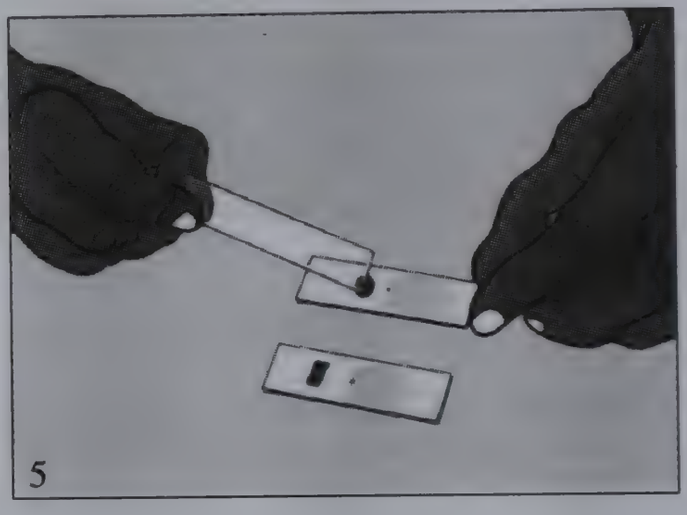
4. *Thin film.* Using a second clean slide as a ``spreader'' and, with the slide with the blood drops resting on a flat, firm surface, touch the small drop with th spreader and allow the blood to run alongits edge, Firmly push the spreader along the slide, keeping the spreader at an angle of 45°. Make sure that the spearder is in even contact with the surface of the slide all the time the blood is being spread.

5. *Thick film* Always handle slides by the edges or by a corner to make the thick film as follows.

   Using the corner of the spreader, quickly join the drops of blood and spread them to make an even, thick film.The blood should not be excessively stirred but can be spread in circular or rectangular form with 3 to 6 movements. The circular thick film should be about 1cm ($\frac{1}{3}$ inch) in diameter.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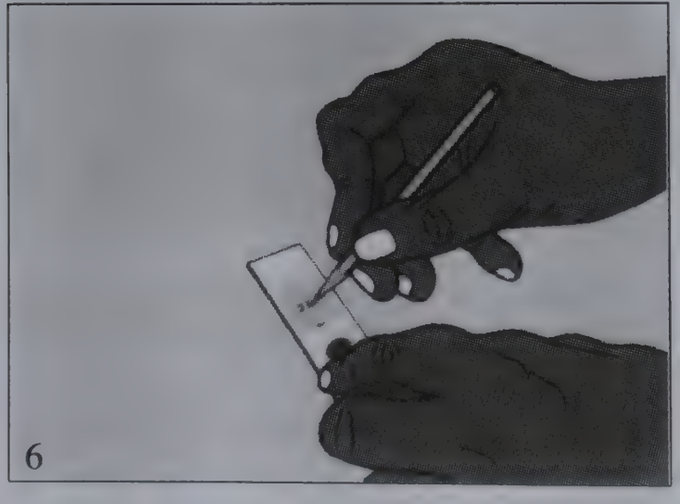
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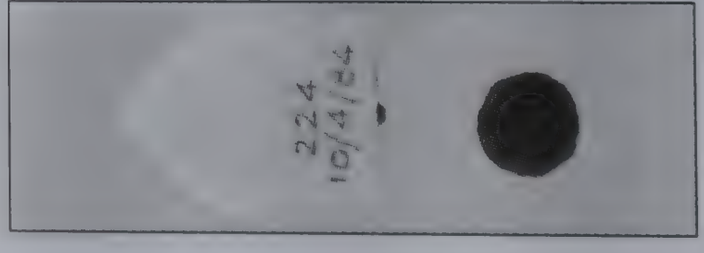
6. Label the dry thin film with a soft lead pencil by writing across the thicker portion of the film the patient's name or number and the date. Do not use a ball-point pen for labelling the slide. Allow the thick film to dry with the slide in a flat, level position, protected from flies, dust and extreme heat.

7. Wrap the dry slide in the patient's record form and dispatch it to the laboratory as soon as possible.*
8. The second slide used for spreading the blood films may now be used for the next patient and another clean slide from the pack will be used as a spreader.



Example of well made and correctly labelled thick and thin films

ANNEX-III

DISEASE PROFILE MONTHLY REPORTING FORM

THC: _____ DISTRICT: _____ MONTH: _____ YEAR: _____

Name of Disease	OPD			IPD			Total	Deaths
	<1	1-4	>4	<1	1-4	>4		
Diarrhoeal Diseases								
Uncomplicated Malaria (UM)								
Treatment Failure Malaria (TFM)								
Severe Malaria (SM)								
Int. Worm Infection								
Peptic Ulcer								
Tuberculosis								
Acute Resp. Infection								
Skin Diseases								
Hepatitis								
Tetanus								
Diphtheria								
Night Blindness								
Deficiency Diseases								
Anaemia								
Asthma								
Whooping Cough								
Measles								
Chicken Pox								
Diabetes								
Eye Diseases								
Ear Diseases								
Dental Diseases								
Hypertension								
Poisoning								
Injuries								
Obs. Gynae. Compli.								
Filariasis								
Kala-Azar								
Mental Diseases								
P.U.O.								
Neonatal Tetanus								
Other Diseases								
Total								

OPD = Outpatients Department; IPD = Inpatients Department